Vallonia perspectiva Sterki. Pecos, Devil's and Nueces drift.
Lymnæa (*Galba*) *parva* Lea. Devil's and Nueces Rivers.
Planorbis trivolvis Say and *P. antrosus* Con. Nueces River.
Planorbis dilatatus Gld. Nueces drift.
Planorbis carus Pils. & Ferr. Devil's and Nueces drift.
Planorbis liebmanni Dkr. Pecos, Devil's and Nueces drift.
Planorbula obstructa (Morel.). Same localities.
Physa sp. Pecos and Nueces Rivers; small specimens only.
Paludestrina protea (Gld.) and *P. seemanni* (Ffld.). Nueces drift.
Cochliopa riograndensis Pils. & Ferr. Pecos and Nueces Rivers.
Helicina orbiculata tropica Pfr. Pecos, Devil's and Nueces drift; also east of Brackettville.

SOME OLD PLEUROCERIDS AND A NEW ONE

BY CALVIN GOODRICH

In the summer of 1923 Mr. W. J. Clench and Mr. L. E. Wehmeyer made a collecting trip by automobile that began at Ann Arbor, Mich., and took in parts of Indiana, Illinois, Missouri, Arkansas, Tennessee, Mississippi, Alabama and Florida. The Pleuroceridæ taken on the journey — described by the travelers as the Voyage of the Asthma — were placed in my hands for identification.

GONIOBASIS LIVESCENS (Menke). Wabash River, Ind., two miles west of Huntington, also two miles west of Peru; Pipe Creek, seven miles west of Peru.

This is a stout, bulbous form, varying little in the upper Wabash drainage. I have it from the Wabash, Logansport; Little Wabash, Huntington; Salamanie, Montpelier; Eel, North Manchester; Tippecanoe, Warsaw; Deer Creek, near Delphi; Coal Creek, Veedersburg. This is on a line running southwest across Indiana. The form is the common one of the Maumee River system of Lake Erie and occurs in the Raisin, Huron and Clinton rivers of eastern Michigan; also in

the more protected parts of the Niagara River and in several of the streams of Ontario. The form is noticeably different from the species in Lake Erie, the type locality of *livescens*.

Anthony described a melanian from the Wabash as *M. cubicoides*.[1] Material from Huntington was identified by Call[2] as this species. The types, which I have examined, are two specimens sharply angled on the body whorl. I am sure that as regards *livescens* of the streams this is only an oddity, rare and of no specific value. However, in Lake Erie are deep-water forms that are carinate to the last whorl, the character being constant. Such shells were dredged a few years ago by students of the Ohio Biological Station at Put-in-Bay and there is a beach in Ottawa County, Ohio, upon which these carinated forms are thrown, doubtless by the severer storms. Call says he did not find *cubicoides* (*livescens*) in the Wabash below Lafayette. It is rather strange that Daniels, who collected several times at Lafayette, did not find any Goniobases there at all.

Other synonyms of *livescens*, whose types I have examined, are:

Melania niagarensis Lea, March, 1841.
Melania napella Anth., Dec., 1850.
Melania cuspidata Anth., Dec., 1850.
Melania elata Anth., Dec., 1850.
Melania occulta Anth., Feb., 1860.
Goniobasis milesii Lea, June, 1863.
Goniobasis lithasiodes Lea, June, 1863.

Pleurocera acuta Raf., Wabash River, two miles west of Huntington, Ind.; Pipe Creek, seven miles west of Peru, Ind.

This is a common associate of *Goniobasis livescens* in northern waters, though apparently it does not go as far north as *livescens*. Call speaks of finding this species (commonly known as *P. subulare* Lea) by thousands at Lafayette "on the muddy banks of the river within the city limits." It is a large form here and specimens taken by Daniels were sent

[1] Proc. Acad. Nat. Sci., Phila., Feb., 1860, p. 60.

[2] Indiana Geological Report for 1899, p. 432.

out as *elevatum* Say. There is some question as to what the true *elevatum* is inasmuch as Say himself appears to point out its resemblance to *canaliculatum*. This would read most of the *elevatum* out of the cabinets. A complex of Pleuroceridæ occurs at Lafayette. It is extremely difficult to tell where *acuta* leaves off and forms of the *canaliculatum-undulatum* group begin. Possibilities are hybridism and a merging of species hitherto unsuspected.

Goniobasis potosiensis (Lea), stream three miles south and a second stream four miles south of Potosi, Washington County, Mo.; creek two miles west of Shepard, Iron County, Mo. All three localities in the drainage of the Meramec River.

Nearly all the specimens taken are juvenile, but agree with Lea's meager description and one individual has exactly the measurements set down for the types. The species is close to *plebeius* Anth., common in the Ozarkian region, differing from it principally in having a much more delicate texture, in being deeply and constantly carinate and in having the outer lip regularly rounded with no angulation whatever. Even quite old specimens would probably be less heavy than the average *plebeius*. A possible synonym is *Goniobasis ozarkensis* Call, 1886.

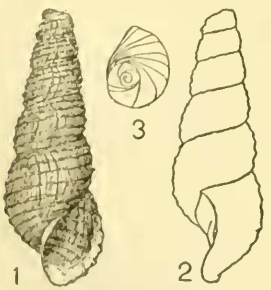
Goniobasis plebeius (Anth.), two miles southwest of Houston, Texas County, Mo. (Gasconade River drainage); two miles southeast of Hardy, Sharp County, Ark. (White River drainage).

These forms are identical with those taken by Call, Hinkley and Brown in the same region. The "center of population" of this species appears to be in Missouri, south of the Missouri River. It is plentiful in northern Arkansas, and there apparently it reaches its largest growth. Certain *Goniobasis* from Des Moines, Iowa, may be assigned to *plebeius*. Dr. Bryant Walker has specimens from Fort Hill, 18 miles south of Ft. Gibson, Indian Territory. This would be in Muskogee County, Okla., the drainage of the Arkansas River. I take the types of *Melania haleiana* Lea, coming from Alexandria, La., and now in the National Museum, to be young *Pleurocera acuta*

Raf. But with this type lot are some juvenile *Goniobases,* almost indeterminate but nearer to *plebeius* than to anything else. If they are this species, the range of *plebeius* is from Iowa to Louisiana, westward into Oklahoma and probably into Kansas.

GONIOBASIS CLENCHI, new species.

Shell: Elongate, rather thin, Dresden-brown to chestnut-brown, the type without color bands. Sutures deeply impressed. Apex eroded. The first of 6¾ whorls remaining is flat in the space between a carinated periphery and a carina just under the suture; the other whorls become increasingly convex to the last one. Sculpture striate-undulate, reticulate; low plicæ are crossed by revolving lines, a tiny point of shell substance rising at each junction of plicæ and horizontal lines. This sculpture continues to the periphery of the last whorl, below which are four sharply-defined revolving lines and one microscopic line. Growth lines are fine, not very regular. Aperture ovate and of moderate size, showing the exterior sculpture through the shell substance. Columella slate-colored, thin, narrow, with a twist or fold near the center. Outer lip decidedly incurved from suture to below the periphery. Sinus not large, but distinct.



FIGS. 1–3.
Goniobasis clenchi.

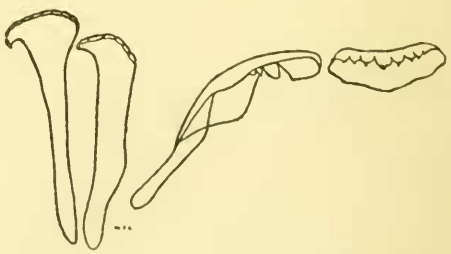


FIG. 4.
Teeth of G. clenchi.

Operculum: Thin, reddish-brown, roughly triangular; altitude 3½ mm., diameter 3 mm. Nucleus depressed. Nuclear whorls sharply-marked, widely-coiled. Striæ deeply incised and showing the regular growth and change of position of the nuclear whorls with relation to the apex. Apex blunt. Left margin curving, very slightly sinuous, thickened; right margin broadly curved, exceedingly thin; basal margin rounded.

Measurements of shell: Altitude, 24 mm.; diameter, 8 mm. Aperture—altitude, 7¾ mm.; diameter, 4 mm.

Type locality: Choctawhatchee River, Newton, Dale County, Ala. Shells taken "on rocks and along bank on ledges; when in middle of river on rocks in one to three feet of water; the Pleuroceridæ crawling there on a fine deposit of silt or very soft mud." Collected by W. J. Clench, July 23, 1923.

The number of whorls of an uneroded adult would probably reach ten. On young shells the first whorls have no sculpture save two carinæ, one close to the suture, the other at the center. The upper carina sometimes resembles a row of minute beads. The periphery of the whorls of juveniles is angular, the base tending to flatten. In a quite old shell the columella is pinkish-white rather than slate-colored and, because of the addition of callus, the fold is apparent only under the hand-glass. Most of the shells are bright and shining. Variation in color, form and sculpture is slight. Of 78 shells that were cleaned of foreign material, six have a narrow, dark band on the base; all of these are young.

The radula appears to differ slightly from that of *Melania depygis* Say as pictured by Troschel and from that of *Pleurocera elevatum* Say, drawn by F. C. Baker. The formula of the denticles is:

$$\left(\frac{1}{12}+\frac{1}{7}\right)+\frac{1}{4}+\frac{1}{3-4+1+3-4}+\frac{1}{4}+\left(\frac{1}{7}+\frac{1}{12}\right)$$

Goniobasis clenchi, belonging to the group of *catenaria* Say, has some of the aspect of that species, notably the sculpture. It is, however, a more narrow shell, is not so strongly carinate; the lip usually is more deeply incurved; the body whorl is broadly rounded whereas in *catenaria* it is subangulate at the center. *Clenchi* has the distinctive operculum of *catenaria,* which also I have found in *G. arachnoidea* (Anth.) and *G. troostiana* Lea, probably geographical outliers of the *catenaria* group.

Herbert H. Smith recognized this species as new. His localities for it were Choctawhatchee River, near Pinckard, Dale County, and the same river near Geneva, Geneva County, Alabama.

The pictures of the shell and operculum were drawn by Miss Mina Winslow; that of the radula by Mr. Clench.

GONIOBASIS DOOLEYENSIS Lea, Choctawhatchee River, Newton, Dale County, Ala.

The Alabama specimens are somewhat smaller than individuals from Georgia and the plicate sculpture is less pronounced, but in all essentials the shells are the same. The types of *dooleyensis* are from Dooly County, Ga. Walker[3] cites it from Early and Baker counties, Ga.; from Chipola River, Fla.; all in the Apalachicola drainage; also from Econfina Creek, Fla., flowing direct in the Gulf. Every one of these streams, including the Choctawhatchee River, come close to one another near their mouths, and probably there has been interchange of fauna.

GONIOBASIS sp., Choctawhatchee River, Newton, Dale County, Ala.

I am unable to recognize this species with the help of descriptions and illustrations published. It may possibly be the form which Lea included under *G. elliottii* as coming from Uchee and Little Uchee rivers, Ala. The shell is slender, smooth, mostly greenish-brown, sometimes dark yellow or nearly black. The apical whorls are carinate, sometimes with two or three or four incised, microscopic, revolving lines. The outer lip is slightly sinuous, the aperture elliptical, the sinus distinct and extended. The shell has a number of narrow bands more often than not.

GONIOBASIS CATENARIA (Say), Itchtucknee River, one mile east of Hildreth, Fla. (Suwanee River drainage).

This is the form which appears in old collections as *M. papillosa* Anth.

[3] Nautilus, XVIII, April, 1905, p. 134.